

# Ale

**DESIGN • PRINT • TRACE**



## Z-SERIES

# SERVICE MANUAL

## Disclaimer

This manual contains instructions for service operations on the ALE Z-series print-heads and ink systems. Read it carefully before performing any manipulation on these.

All service operations should be undertaken by qualified personnel only. Contact-us if you need training for our equipment.

All information written in this Service Manual was correct at the time indicated in the version table below. However, the continual enhancement of our products may result in some differences existing between the information contained in this document and your equipment.

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Version history:

Date:	Revision:	Modifications:	Author:
18/10/2007	0	Initial release	AF
11/06/09	V1	Reservoir w/ DP, driver board	AF
03/08/09	V1.1	Electronics, cleaning	AF

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## Notes

# 1 The Z printer architecture

The Z series printers are designed to be "all-in-one" printing systems. Each Z printer consists of an ink system connected to a print-head with a 1m long umbilical. The enclosure also includes the electronics to drive the print-head, a keypad and an LCD screen for the user.

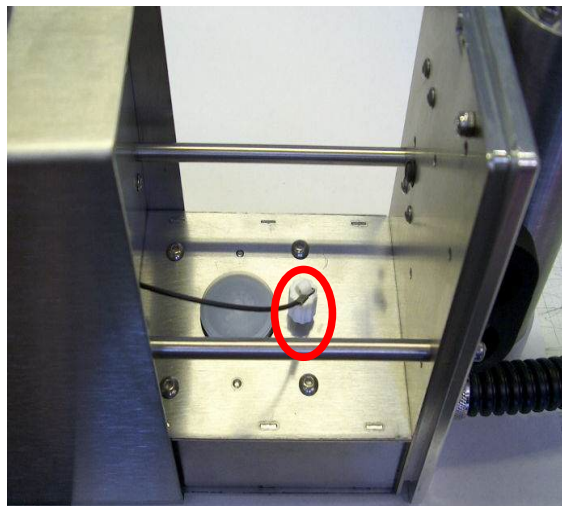
Each Z printer contains hydraulics and electronics:

- Hydraulics allow the ink flow from the reservoir (ink system) to the print-engine (print-head)
- Electronics are used to send the data to the print-engine(s), to control the pump and to communicate with the external world (RS232, USB...)

Both the printer itself and the print-head are enclosed in stainless steel, at least 1,2mm thick.

## 1.1 Ink circuit

The Z series printers introduce a single reservoir design with automatic level control and pump-assisted priming. The bottle fitted on this reservoir is compatible with the entire range of ALE ink systems. It contains a valve which is automatically sealed during bottle removal and fitting. The reservoir is normally open to air via the *air vent* hole (Fig. 1).



*Fig. 1: Reservoir air vent with cap*

### 1.1.1 Z18 ink circuit

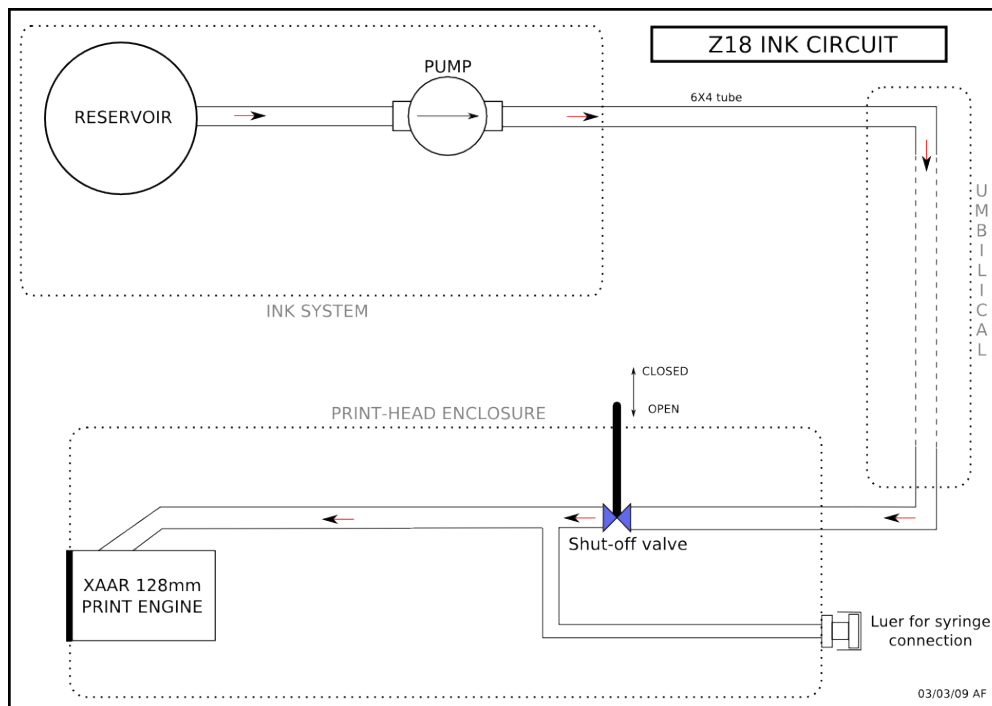


Fig. 2: Z18 ink circuit

Below is a schematic describing the Z18 ink circuit. It includes a reservoir with a direct prime module, a pump, an ink tube and a shut-off valve for the print-head with a syringe connection. The shut-off valve allows to close the ink circuit between the ink reservoir and the print engines. Because the syringe connection is located between the valve and the print engine, it is possible to use a syringe to flush the print engines only (the valve is closed for that operation, see [2.7 Flushing a Z18/34 print-head with a syringe](#)) Priming mode : the pump sucks ink from the reservoir and sends it towards the print-engine through the umbilical. If the shut-off valve is closed, nothing happens. The ink is blocked.

If the shut-off valve is open, the ink will go through the print engine.

When the pump is active, the ball in the direct prime module (located in the reservoir) blocks the way and the ink cannot go back to the reservoir. When the pump is inactive the ball goes out of the way and the ink can pass through the direct prime (see Fig. 4).

Printing mode : the print engine takes ink from the reservoir through the direct prime module, through the 6X4 tube, and the valves. The ink is ejected by the print engine nozzles.

### 1.1.2 Z34 ink circuit

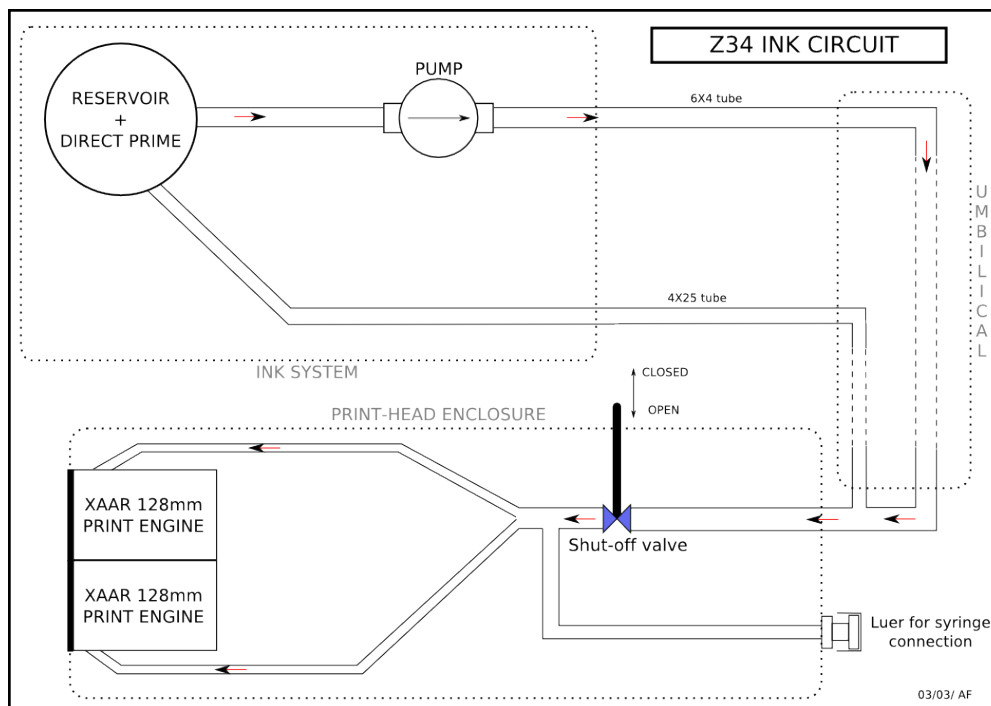


Fig. 3: Z34 ink circuit

Below is a schematic describing the Z34 ink circuit. It includes a reservoir with a direct prime module, a pump, two ink tubes and a shut-off valve for the print-head with a syringe connection. The shut-off valve allows to close the ink circuit between the ink reservoir and the print engines. Because the syringe connection is located between the valve and the print engines, it is possible to use a syringe to flush the print engines only (the valve is closed for that operation, see [2.7 Flushing a Z18/34 print-head with a syringe](#))

Priming mode : the pump sucks ink from the reservoir and sends it towards the print-engine through the umbilical. If the shut-off valve is closed, all the ink flows back to the reservoir through the 4x25 tube. This is particularly useful to get rid of air in the umbilical (e.g. when the system is dry), without losing ink: the pump will force the air back into the reservoir where it can escape through the air vent hole. When there is no air left in the umbilical, only ink is sent back to the reservoir.

If the shut-off valve is open, most of the ink will go through the print engines. A small part of the ink will still go back to the reservoir through the 4x25 tube.

When the pump is active, the ball in the direct prime module (located in the reservoir) blocks the way and the ink cannot go back to the reservoir. When the pump is inactive the ball goes out of the way and the ink can pass through the direct prime (see Fig. 4).



Printing mode : the print engines take ink from the reservoir through the direct prime module, through the 6X4 tube, the valves and the filter. The ink is ejected by the print engines nozzles.

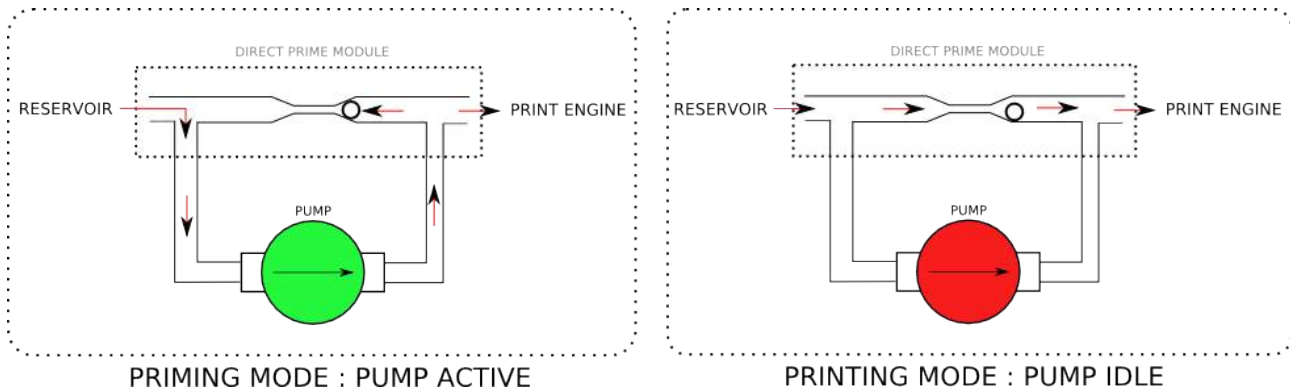


Fig. 4: Direct prime

## 1.2 Pump function

The pump only function is to prime the ink circuit. It is not used to refill the reservoir, this is done automatically by gravity.

The pump can operate at two pressure rates:

- "Norm" : normal power priming, used to remove small air bubbles from the circuit or to clean the nozzles plate. The pump is only activated for a few seconds at a time
- "Jet" : high power priming, used to fill an empty ink circuit

The pump is connected to the electronics and is activated by using a "Pulse Width Modulated (PWM)" signal.

## 1.3 Electronic components

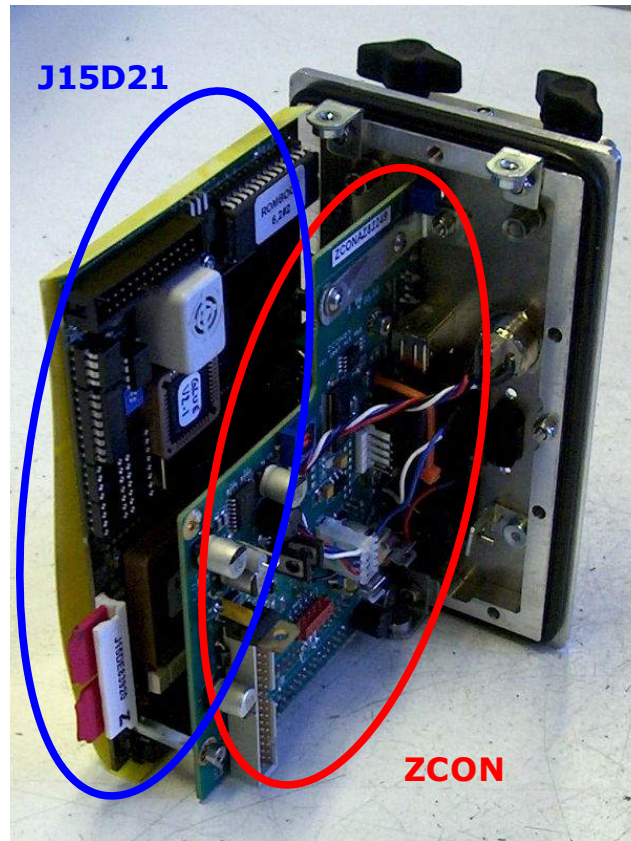
The Z18 and Z34 electronics are almost identical as they are printing with 18mm print-engines (1 for the Z18, 2 for the Z34).

### 1.3.1 Z18 and Z34 electronics

The electronics of the Z-series printers is made of 2 linked boards: ZCON (connector board) and J15D21 CPU board. ZCON has all the connections (keyboard etc...) plus ink low detection and pump control. J15D21 is in charge of the printing itself.

Both are located in the electronics compartment of the printer.

In case any component (FPGA for example) has to be replaced or upgraded, please contact ALE for a step-by-step operations procedure.

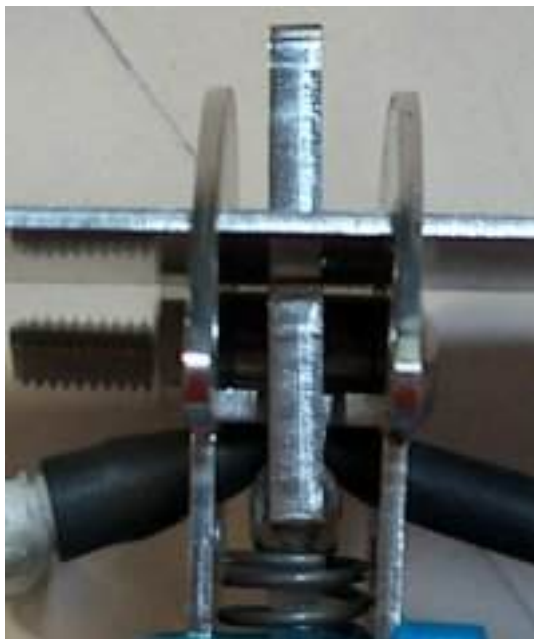


*Fig. 5: Z-series electronics*

## 1.4 Hydraulic architecture

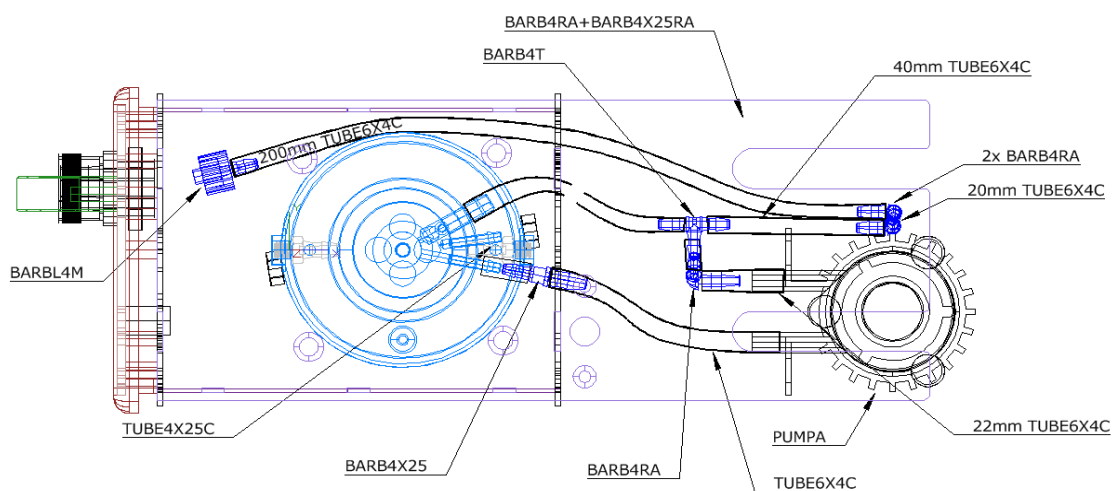
### 1.4.1 Z18 hydraulic architecture

Below are graphics describing the ink circuit in the ink system (Fig. 7) and the print-head (Fig. 8). The shut-off valve is made of a flexible tube clamped by a switch and a spring (Fig. 6).

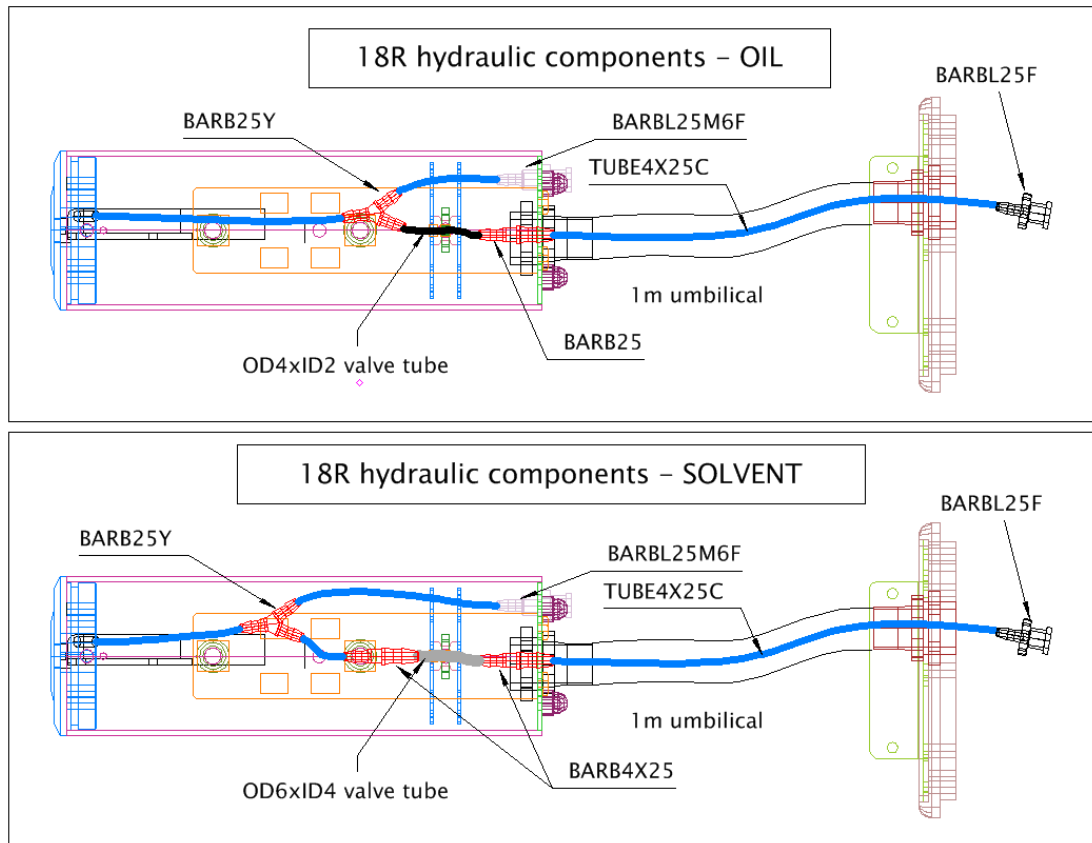


*Fig. 6: Oil version clamp valve*

Note that depending on the version (Oil or Solvent), the valve tube is not the same. Always replace tubes and fittings with those supplied by ALE.



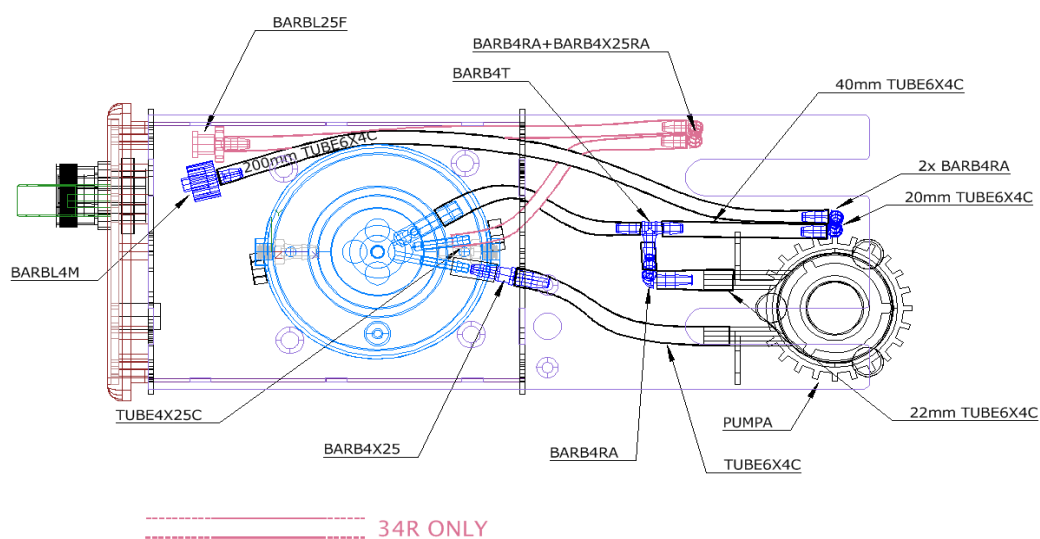
*Fig. 7: Z18 ink system tubes and fittings*



*Fig. 8: 18R print-head tubes and fittings*

### 1.4.2 Z34 hydraulic architecture

Below are graphics describing the ink circuit in the ink system (Fig. 9) and the print-head (Fig. 10). Note that depending on the version (Oil or Solvent), the valve tube is not the same. Always replace tubes and fittings with those supplied by ALE.



*Fig. 9: Z34 ink system tubes and fittings*

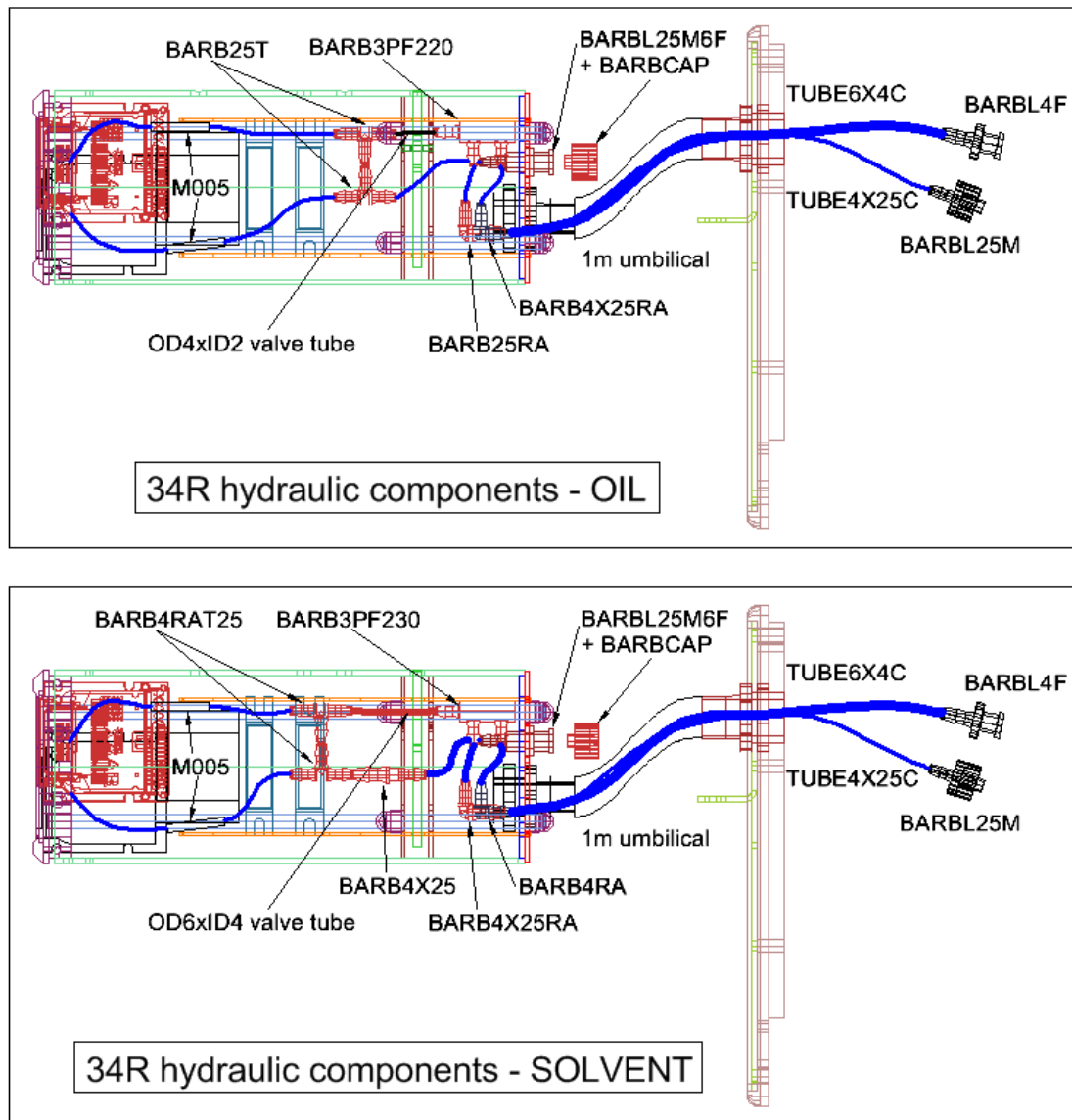


Fig. 10: 34R print-head tubes and fittings

## 1.5 Colour codes and ink compatibility



**WARNING:** Never change the ink type in a printer and use only ALE supplied fluids! Mixing different inks causes catastrophic damage. Components of the hydraulic circuit can be damaged by inappropriate ink or solvent.

The ink reservoirs and pumps are coded with colour tie-wraps. The pumps are coded with a tie-wrap around the gear-head.

Ink reservoir and pump colour codes:

- RED means: compatible with ALE supplied **solvent-based** inks
- YELLOW means: compatible with ALE supplied **oil-based** inks
- NONE means: compatible with ALE supplied oil-based inks

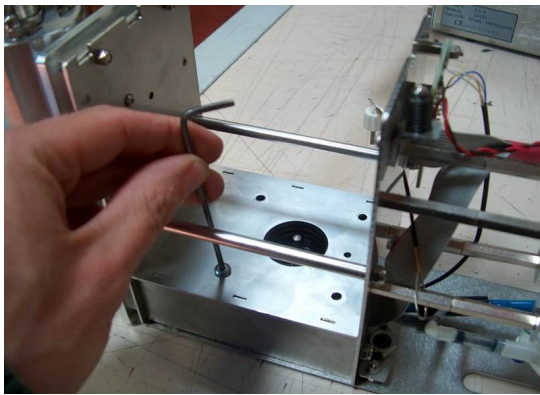
*Other ink types:* please contact ALE for further compatibility information.

## 2 Service procedures

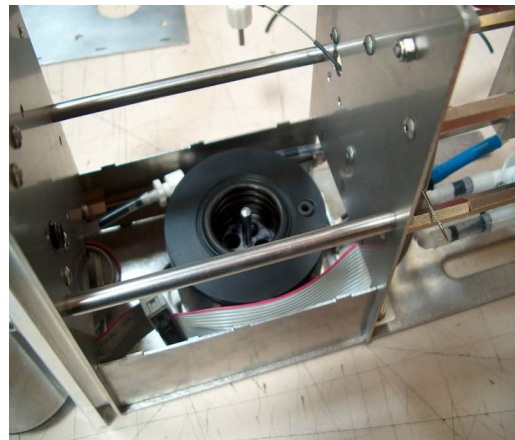
### 2.1 Access to the ink reservoir

Access to the contents of the ink reservoir is needed for replacing the filter at the bottom of the reservoir.

- Remove the ink bottle and the air cap if still present
- Unscrew the top plate (4 M4 button-head screws through the ink tray). Remove the plate. Be careful that a small o-ring from the reservoir lid doesn't stick to it.

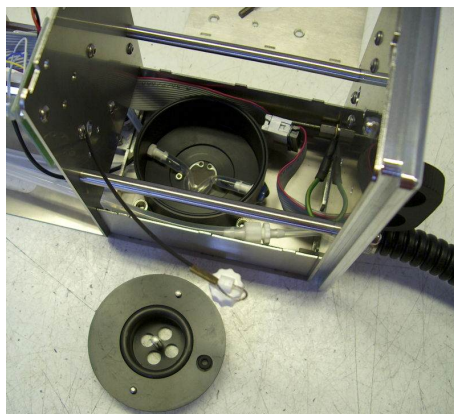


*Fig. 11: remove M4 screws from the top plate*



*Fig. 12: remove the top plate*

- Remove the lid of the reservoir. You now have access to the contents of the reservoir.



*Fig. 13: remove the lid of the reservoir*



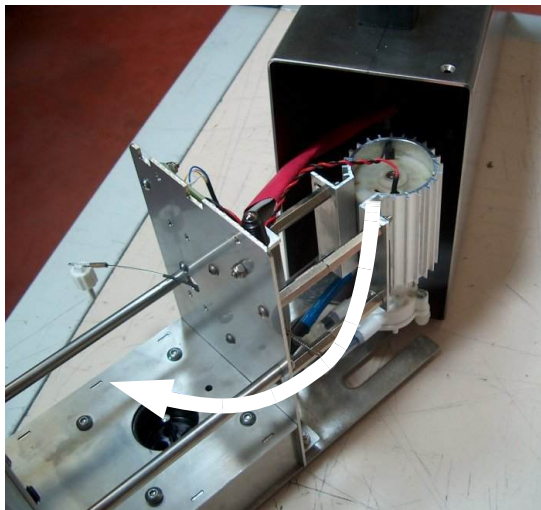
## 2.2 Remove the hydraulic drawer

- Unscrew the M3 countersunk screw (2mm Allen key) and the 5,5mm nut that hold the drawer inside the ink system

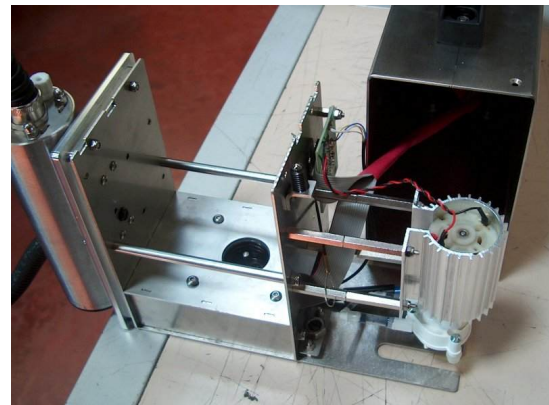


*Fig. 14: Remove M3 screw and 5,5mmnut*

- Pull the drawer and rotate it to the left (Fig. 15 and Fig. 16)



*Fig. 15: pull and rotate the drawer to the left*



*Fig. 16: rotated hydraulic drawer*

- Disconnect the 25 ways connector from the bulkhead at the back of the hydraulic compartment.





*Fig. 17: remove the 25 ways connector*

- The hydraulic drawer is now completely removed.

## 2.3 Open the electronics compartment

Here are the steps to follow to open the electronics compartment of a Z18/34:

- Remove power lead
- Remove the counter-sunk screw at the bottom of the back plate (Fig. 18) with a 2mm Allen key.



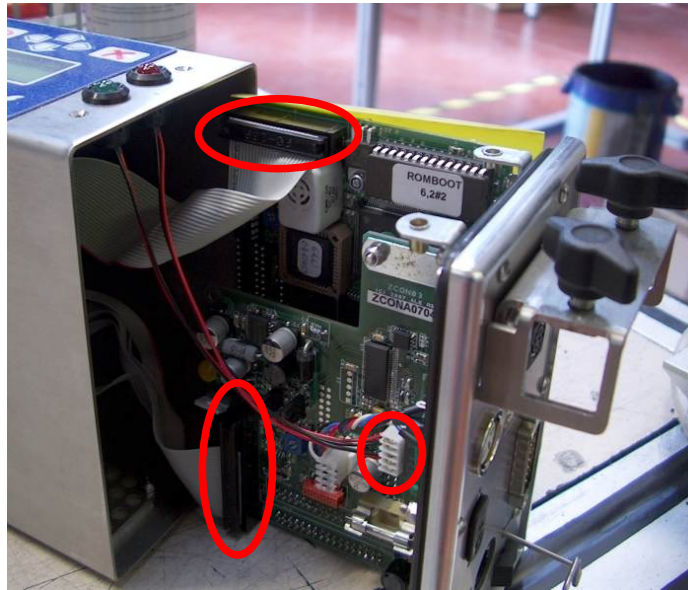
*Fig. 18: remove the counter-sunk screw (2mm Allen key)*



*Fig. 19: remove the 2 counter-sunk screws (2mm Allen key)*

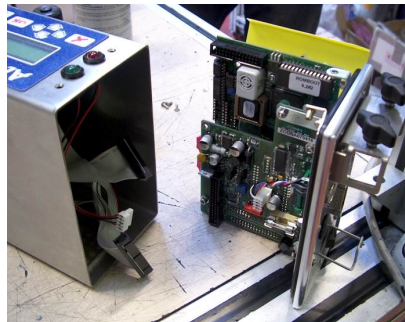
- Remove the 2 counter-sunk screws at the top of the back plate (Fig. 19) with a 2mm Allen key.

- Extract the back plate carefully (Fig. 20)



*Fig. 20: start extracting the back plate*

- Remove the three connectors (LCD, LEDs and Printing) from the connector board (shown on Fig. 20)

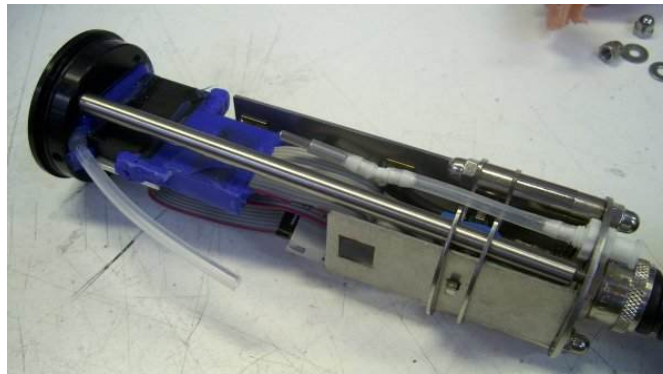


## 2.4 Changing a print engine

### 2.4.1 Changing the Z18 print engine

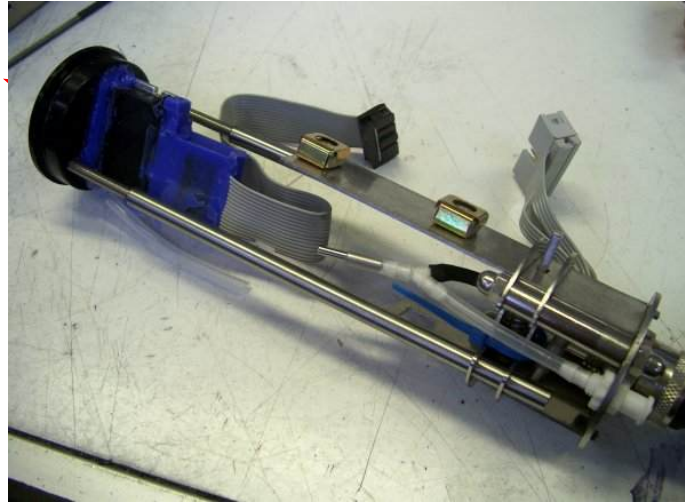
To change the Z18 print engine follow these steps:

- open the print-head by following the instructions given in [2.8.1 Open the Z18 print-head](#)
- Disconnect the ink tube between the print engine and the valve (Fig. 21)



*Fig. 21: disconnect the ink tube*

- Disconnect the print engine connector and extract the print engine assembly (Fig. 22)



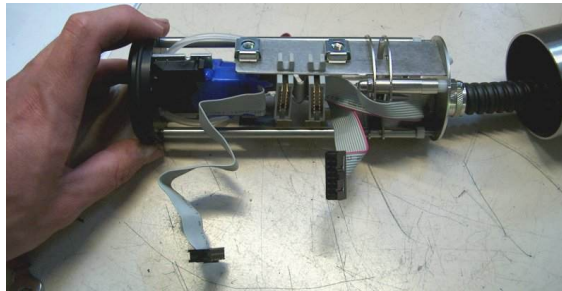
*Fig. 22: disconnect and extract the print engine*

– replace the print engine assembly and reassemble the print-head by following the steps in reverse order

### 2.4.2 Changing a Z34 print engine

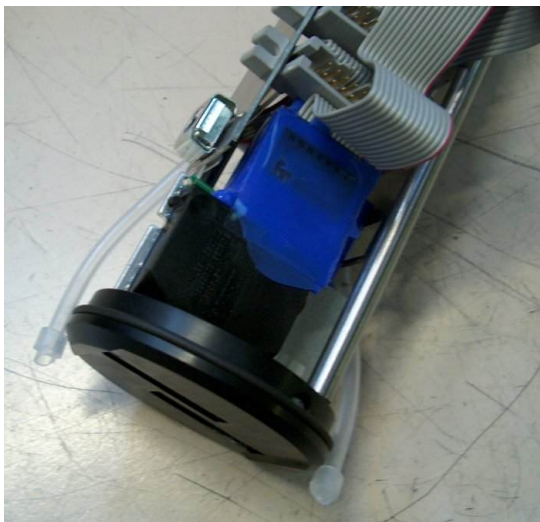
To change the Z34 print engine follow these steps:

- open the print-head by following the instructions given in [2.8.2 Open the Z34 print-head](#)
- Disconnect the print engine electronic connectors (Fig. 23).



*Fig. 23: unplug the electronic connectors*

- Disconnect the ink tubes from the print engines (Fig. 24) and extract the print engines assembly (Fig. 25).



*Fig. 24: disconnect ink tubes*



*Fig. 25: extract the print engine assembly*

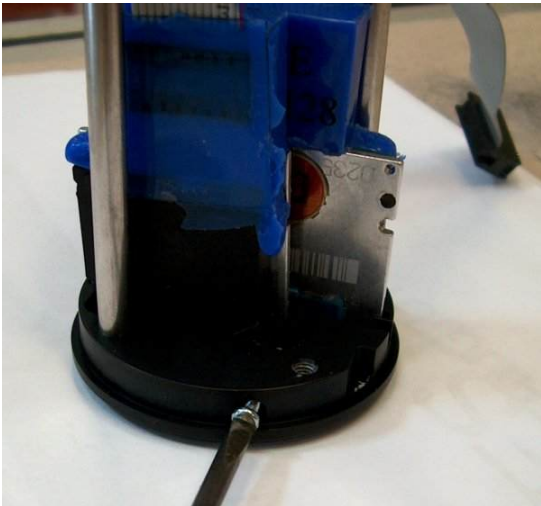
- Remove the ink tubes left (Fig. 26).



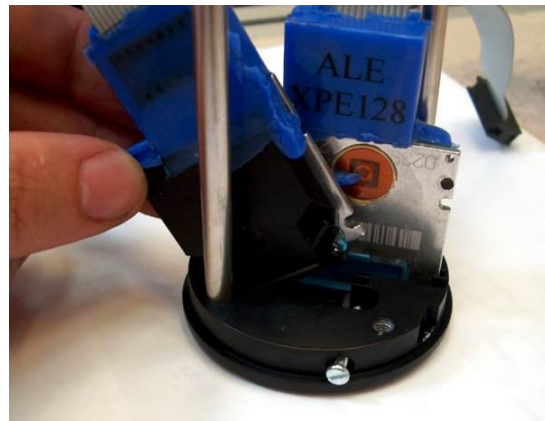
*Fig. 26: remove the old ink tubes*

- Unscrew the flat-head screw holding the defective print engine (Fig. 27) and remove the print engine (Fig. 28).



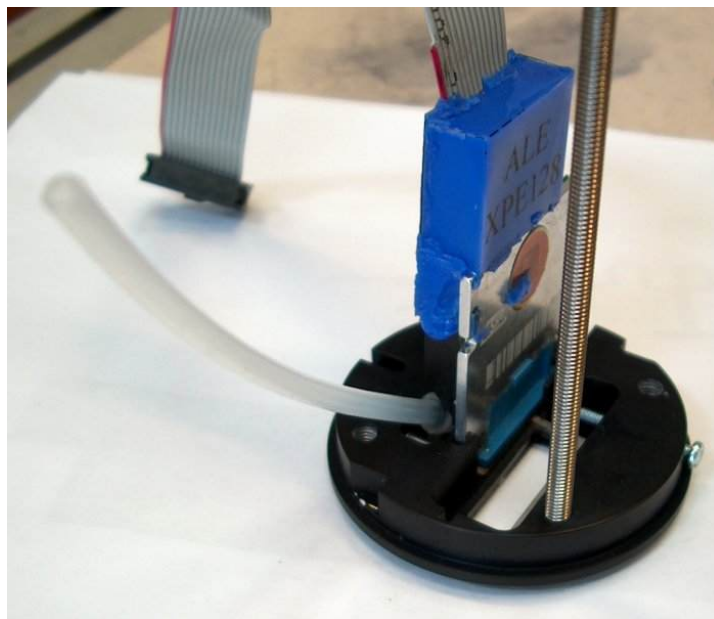


*Fig. 27: unscrew M2,5 flat-head screw*



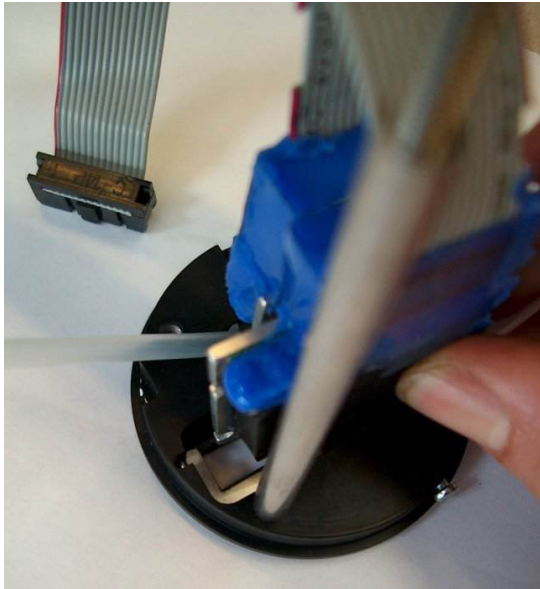
*Fig. 28: remove deficient print engine*

- Fit the replacement tube on the remaining print engine –given with the replacement print engine (Fig. 29).



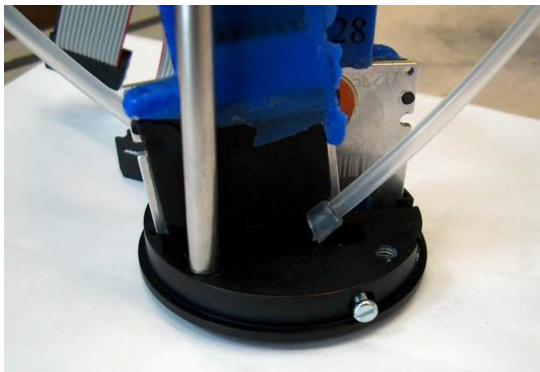
*Fig. 29: fit replacement tube*

- Put the new print engine in place (Fig. 30).



*Fig. 30: put the new print engine*

- Re-screw the M2,5 flat-head screw



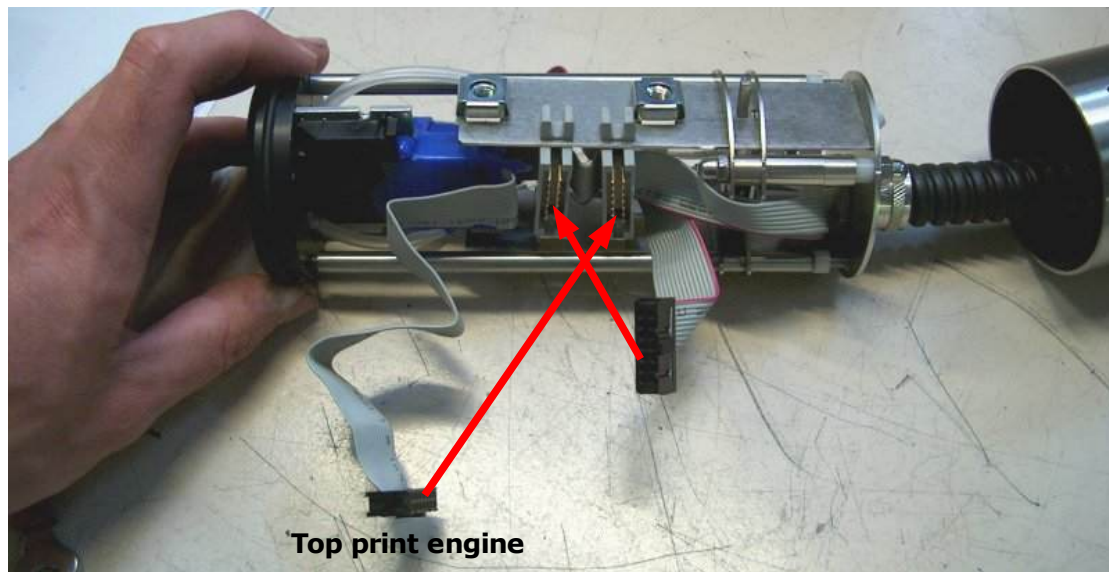
*Fig. 31: place the new print-engine*



*Fig. 32: re-screw the M2,5 screw*



Connect the ink tubes coming from the print engines to the ink circuit. Re-connect the print engines electronic connectors (Fig. 32).



*Fig. 33: re-plug the electronic connectors*

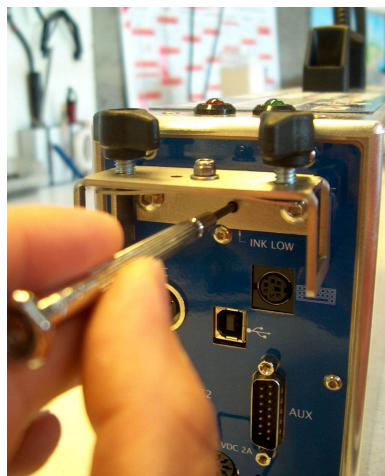
- reassemble the rest of the print-head by following the steps given in [2.8.2](#) [Open the Z34 print-head](#) in reverse order.

## 2.5 Adjusting the ink low detection

Ink low detection has been specifically adjusted in ALE factory according to ink type and should not be changed : there is a risk of running the printer dry or to have a too frequent ink low signal on the printer.

Proceed as follows if you still wish to adjust ink low detection:


- Switch the printer OFF
- Use a long and thin "cross-head" screwdriver to reach the potentiometer on the ink low PCB (Fig. 34)

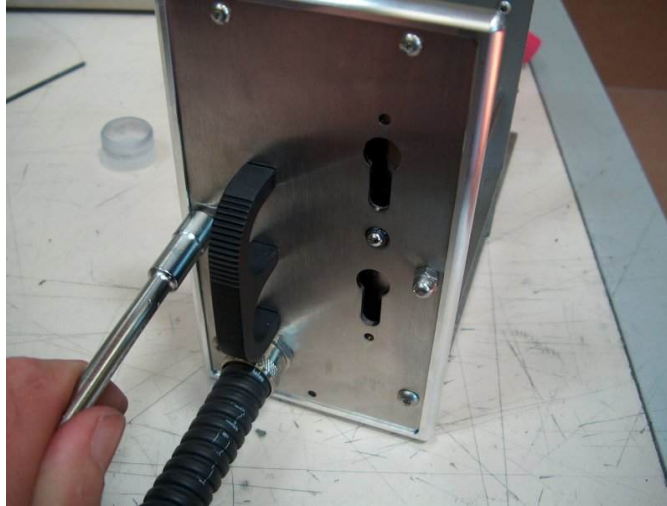


*Fig. 34: Ink low adjusting*

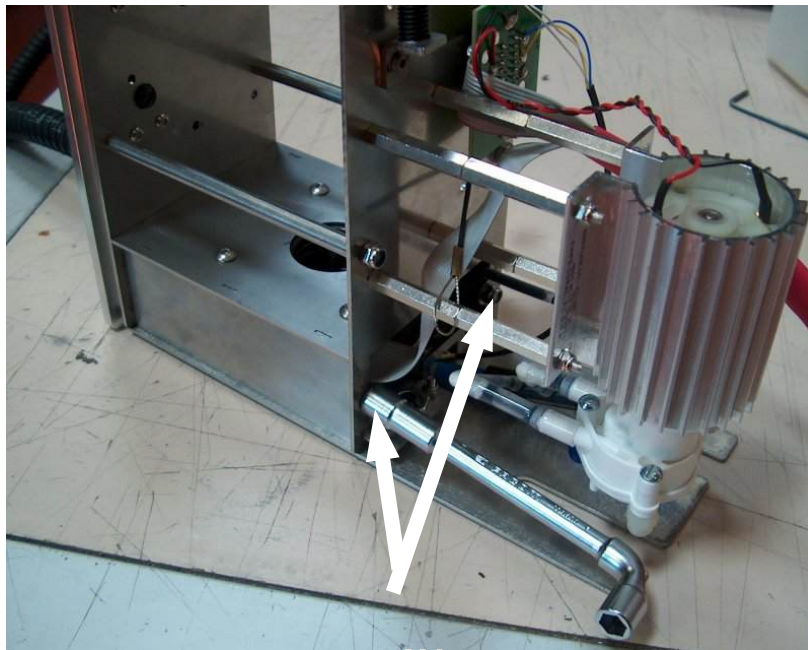
- Switch the printer ON
- Adjust the potentiometer as necessary. Don't forget that ink low detections have a latency: ink takes a bit of time to drip from the detection tubes.

## 2.6 Separating the print-head from the ink system

- Empty the ink circuit : remove the ink bottle, use the "jet"  function of the purge menu to empty the ink circuit
- Switch the printer off
- Extract the hydraulic drawer as shown in [2.2 Remove the hydraulic drawer](#)

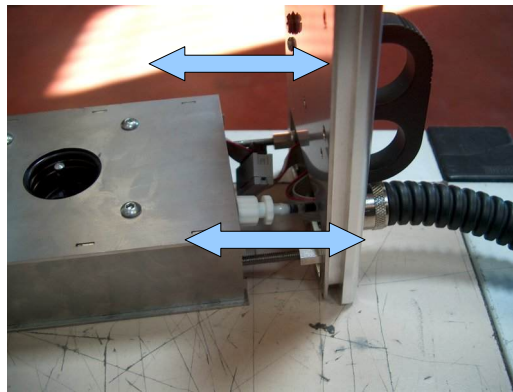


*Fig. 35: unscrew M3 dome nuts*



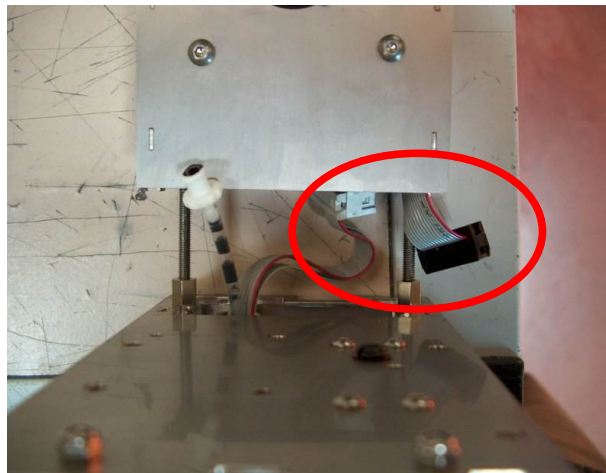
*Fig. 36: unscrew M4 nylock nuts*

- Unscrew both M4 nylock nuts from the pump plate (7mm key), see Fig. 36.
- Unscrew the two M3 dome nuts (5,5mm key) on the external plate of the drawer (Fig. 35).
- Separate carefully the umbilical plate from the reservoir assembly by 3–4cm (Fig. 37, next page).



*Fig. 37: separate carefully reservoir assembly and umbilical plate (4cm max.)*

- Unplug the electronic connector and the ink connector(s) (Fig. 38).



*Fig. 38: unplug ink and electronic connectors*

- Finish extracting the umbilical plate (Fig. 39). Close the tubes with caps to protect the ink circuit from the dust.



*Fig. 39: separated umbilical*

To reassemble the print-head and the umbilical, follow the same steps in reverse order.

## 2.7 Flushing a Z18/34 print-head with a syringe

By connecting a syringe at the back of the print-head, it is possible to flush only the print engines (and not the rest of the circuit).

To empty the print-head for transportation, use the syringe without any fluid. The syringe will be used to expel the fluid from the print engines.

To recover a missing dot, fill the syringe with **Ale** ODFLUSH solvent if the machine is for **Ale** BODNPM ink or with **Ale** SOB if the machine is for **Ale** BOB ink.

Disconnect the print-head from its bracket and put it over a collecting tray. To connect the syringe to the print-head, remove the syringe cap from the back of the print-head and screw the syringe luer (**not too tightly, the thread is conical and may be very hard to unscrew!**).



*Fig. 40: flushing the Z18/34 print-head with a syringe*

GENTLY flush the print-head as desired, remove the syringe and **plug the syringe cap back**

After flushing to recover missing dots it will be necessary to go again through the priming procedure to refill the print engines with ink.



## 2.8 Opening the print-head

### 2.8.1 Open the Z18 print-head

Completely empty the print-head first. Remove the ink bottle and purge the ink circuit until nothing comes out of the print-engines (see controller instruction for purging).



*Fig. 41: unscrew the grub screw from the tube*

- Unscrew the M4 grub screw from the tube with a 2 mm Allen key (Fig. 41)
- Unscrew the two M5 shoulder screws from the tube with a 3 mm Allen key (Fig. 42)



*Fig. 42: unscrew the shoulder screws from the tube*

- Unscrew the two M4 dome nuts from the back of the print-head with a 7mm key (Fig. 43)



*Fig. 43: remove M4 dome nuts*

- Push the valve switch inside the tube and rotate the tube with respect to the back plate to hold the switch inside (Fig. 44)



*Fig. 44: push the switch inside the tube*

- Move the tube backwards and remove it from the print-head (Fig. 45 and Fig. 46, next page)



*Fig. 45: remove the tube*



*Fig. 46: tube removed from the print-head*

### 2.8.2 Open the Z34 print-head

Follow this procedure:

- Completely flush the print-head first. Remove the ink bottle and purge the ink circuit until nothing comes out of the print-engines (see controller instruction for purging).



- Unscrew and remove the two M4 dome nuts from the back plate (Fig. 47).



*Fig. 47: Unscrew the two M4 dome nuts*

- Remove the syringe plug (Fig. 48) and the back plate (Fig. 49).



*Fig. 48: remove the syringe plug*



*Fig. 49: remove the back plate*

- Unscrew the two M5 shoulder screws (3mm Allen key, Fig. 50) and the M3 grub screw (2mm Allen key, Fig. 51) from the tube



*Fig. 50: unscrew the two M5 shoulder screws*



*Fig. 51: unscrew the M3 grub screw*

- With a tool, push the valve switch inside the tube and rotate the tube with respect to the back plate to hold the switch inside



*Fig. 52: push the valve switch inside the tube*

- Pull the tube backwards and remove it from the print-head (Fig. 53 and Fig. 54).



*Fig. 53: pull the tube backwards*



*Fig. 54: remove the tube from the print-head*

## 3 Maintenance

### 3.1 Periodic service

You can contact **Ale** for a service kit containing all the necessary filters, o-rings and tubes matching the ink used in your printer.

The following actions should be taken during the periodic service:

#### 3.1.1 print-head

- Open the print-head by following the instructions given in [2.8.1 Open the Z18 print-head](#) and [2.8.2 Open the Z34 print-head](#)
- Inspect tubes and fittings for leaks
- Inspect ribbon cables for possible damage
- clean interior and exterior surfaces
- Inspect the clamp valve tube for leaks or damage ( cracks...). Replace if needed by a new tube of the same material (supplied in the service kit)
- Prime the engine and print a black pad ("test" in the prime menu of the controller, see controller manual for details) to make sure all dots are printing.

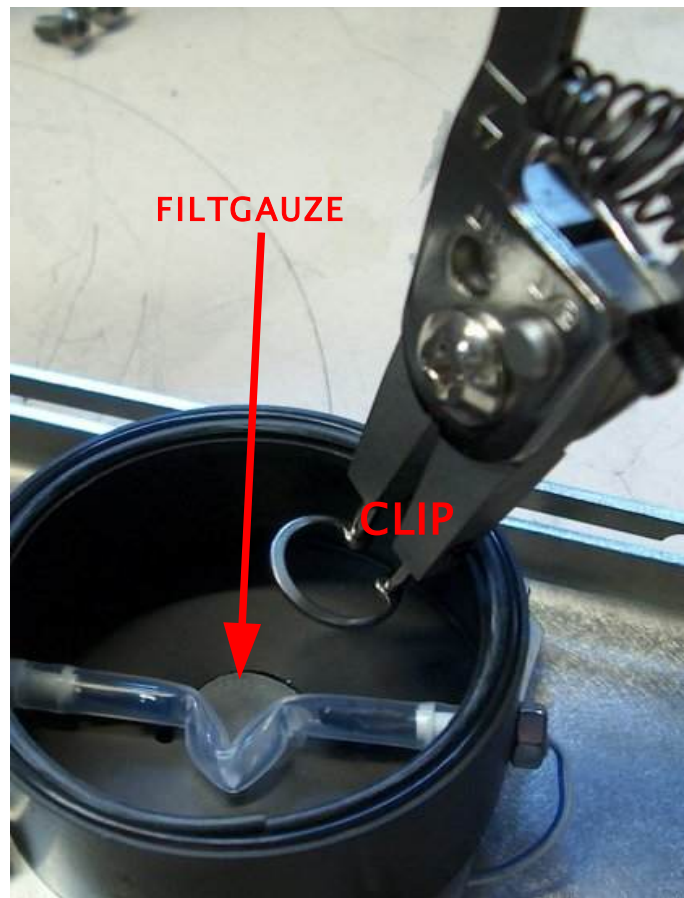
#### 3.1.2 Ink system

The following actions should be taken during the periodic service:

- Open the pump compartment as in [2.2 Remove the hydraulic drawer](#)
- Open the reservoir (see [2.1 Access to the ink reservoir](#)) and empty it with a syringe. **Do not turn the ink system upside down!**
- Inspect tubes and fittings for leaks
- Inspect circuit board for cleanliness
- Clean interior and exterior surfaces
- Replace the filter (ref FILTGAUZE) at the bottom of the reservoir: remove the clip holding the filter, replace the filter, put back the clip.



**Do not let dirt fall into the circuit!**



*Fig. 55: Gauze filter replacement*

- Replace the o-rings in the reservoir by new o'rings supplied in the service kit
- Reassemble the entire printer, prime it and check print quality.



## 3.2 Transport

### 3.2.1 Empty the ink circuit

It is recommended to clean and empty the printer before transport. To flush out the printer:

- Remove the ink bottle
- Switch the printer ON
- Put the print-head in this configuration : print-down, with a collecting bucket (Fig. 56)



*Fig. 56: ink collection configuration*

- Use the pump in "jet" mode (see controller user manual for details) as many times as necessary to empty the system from ink
- When ink is out, replace the air cap and the shipping cap on the reservoir
- Flush the print-head (Z18/34) with air (see [2.7 Flushing a Z18/34 print-head with a syringe](#) ) to expel the remaining ink

### 3.2.2 Pack the printer

- Pack with care. Make sure the nozzle plate cannot be damaged during transport (Refit the protection cap delivered with every Z18/34).

### 3.3 Procedure for long term storage of solvent-based printers

If the printer is not to be used for a period longer than one fortnight (15 days), this procedure must be followed to store the printer. **Not following this procedure will invalidate the warranty of the printer.**

#### 1. Empty the circuit of ink

- Put a collection tray under the print-head to catch the ink (Fig. 56)
- Check that the ink valve is opened (see Z-series operator manual)
- Remove the ink bottle
- Switch the system on
- Using the "Jet" function of the controller purge menu, empty the circuit of ink as much as possible

#### 2. Flush the circuit with solvent

With the same configuration as in step 1, **fit a flush bottle** on the reservoir (Fig. 57), and use either "Jet" or "Norm" functions to get a completely transparent flow of flush from the print-head.

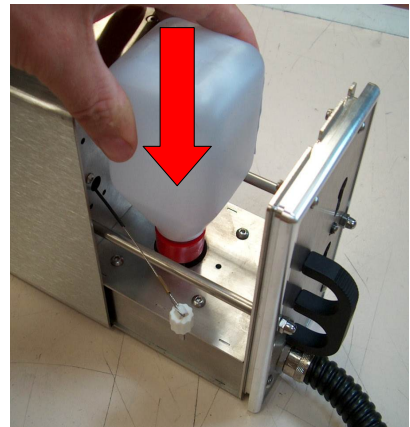


Fig. 57

### 3. Empty the circuit of solvent

Remove the solvent bottle from the reservoir (Fig. 58), and again use "Jet" and "Norm" functions to remove all fluid from the circuit.



*Fig. 58: remove the solvent bottle*

### 4. Flush the circuit with air

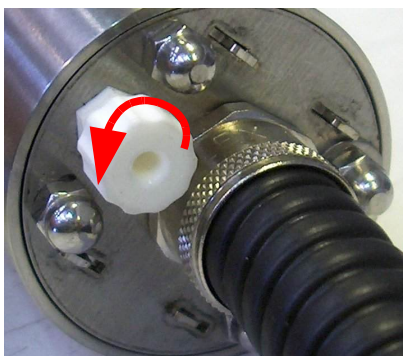
18 and 34mm print-heads can be further cleaned by using the syringe connection at the back of the print-head to expel as much flushing fluid as possible.

Proceed as follows:

- Switch the system off
- For 18 and 34mm print-heads, remove the print-head from its bracket. This will close the automatic valve and ensures that the air that will be sent will only go through the print engines. Use an ink collection tray (Fig. 59).
- Remove the syringe connector cap (Fig. 60)



*Fig. 59*



*Fig. 60*



- Either with a syringe filled with air (Fig. 61) or a low pressure air hose (<0,8bar), expel the rest of the solvent from the print-engines.



Fig. 61

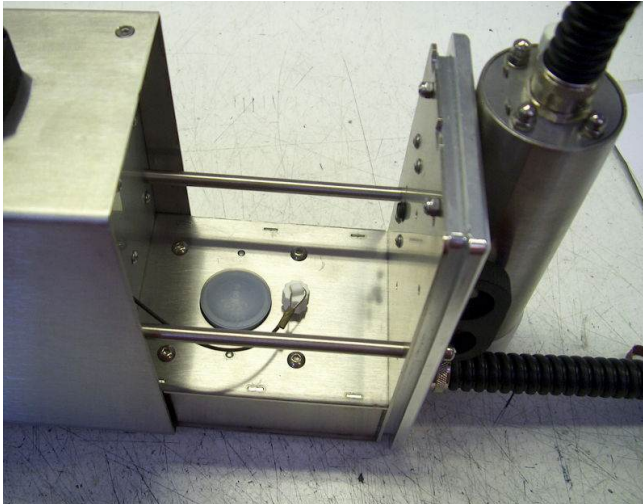


If the pressure is superior to this given value, there is a risk of tearing off the nozzle plate, which would destroy the print engine

## 5. Close the ink circuit

On the reservoir, refit the cap and the transport pin (attached to the ink system with a wire) (Fig. 62). On 18 and 34mm print-heads, refit the print-head front plate protection cap .



*Fig. 62**Fig. 63*

## 6. Storage instructions

Store the printer in a clean environment, in its original packaging, away from extremes of heat and cold.

### 3.4 Managing effects of large temperature changes

Inks are sensitive to the temperature of the environment. The temperature range that is acceptable will depend on the type of ink used and the application.

It is important to establish that the inks in use will be appropriate for all seasons of the year.

- If the factory is very hot in summer and very cold in winter, the ink may give different print results
- Do not install the system near a window where direct sunlight can affect it

*Almost-empty* ink bottles are sensitive to *significant* temperature variations in a short period of time, for example, between day and night. The air in an empty bottle will expand and contract with temperature and cause the reservoir level to move up and down.

Depending on the ink types, large *daily* expansion and contraction of air in an almost-empty bottle may affect print quality and/or dripping from the print-engine nozzle due to there being too high a level of ink in the reservoir at certain times during the day:

- In factories with large *daily* temperature fluctuations, be prepared to only allow bottles to become half-empty (it is the air in the bottle that expands, not the ink).
- Alternatively, remove the ink bottle when the system is not in use and fit the shipping cap. This will prevent the reservoir level changing.
- When print re-starts the excess ink will be taken from the reservoir first, quickly restoring the correct level.

### 3.5 Fault diagnosis

Refer to the Z-series operators manual for basic fault diagnosis of common printing and priming problems likely to be encountered during installation and use of the system. Listed below is additional information.

After priming, print is OK for a few minutes. Then progressively de-primed (horizontal lines appear in the image); or print is “grey”.

- Insufficient prime pressure to clear air from the tubes in new systems or in systems that have run dry.
  - ➔ Temporarily set the prime pressure to HIGH and prime.
- Print heads are being lifted by the customer during priming so air flows back in to the engines due to incorrect level.
  - ➔ Print heads should not be moved during priming.
- Shocks to umbilicals or print heads.
  - ➔ Isolate from source of vibration.
- Pump has failed
  - ➔ Prime while checking for a good flow of ink from print engine(s)
- Tubes kinked (a "kink" occurs when a tube bends too much)
  - ➔ Prime while checking for a good flow of ink from print engine(s). With Z34 system check for the same flow from both engines.
- Bottle valve is not opening properly or worn-out due to the same bottle being re-used.
  - ➔ Don't re-use bottles.

Bottom of print missing on an engine.

- Needs priming:
  - ➔ Prime
- Ink reservoir level too high causing an “ink bubble” on nozzles:
  - ➔ Adjust levels
  - ➔ Reservoir level too high due to empty bottle together with large daily temperature changes
  - ➔ Air leak in tubes or seals of reservoir, pump or badly fitted bottle

Top of print missing on an engine:

- Needs priming:
  - ➔ Prime

Random dots missing:

- Nozzles blocked, by a particle or by drying (solvent version)
  - ➔ Purge the print-head (use the “Jet” position). If the problem remains, on a Z18/34, it is possible to flush the print-head with a syringe (see [2.7 Flushing a Z18/34 print-head with a syringe](#)). If the nozzles remain blocked, contact your distributor.

Engine not printing or exactly half of engine not printing:

- Loose connection – check ribbon cables in print-head:
  - ➔ Replace connector or use silicone paste as necessary

No print – photocell does not work:

- Installation uses a shaft-encoder and line is stationary:
  - ➔ Line must be moving for photocell to be detected when controller set in shaft-encoder mode
- When using the I/O monitor function on controller “other functions” menu, the display “P00” changes to “P10” during photocell activation:
  - ➔ Photocell is OK – problem with message ?
- I/O monitor normally shows P10 and changes to P00 when photocell is activated:
  - ➔ Detection is inverted – change photocell or change the detection setting in the controller
- I/O monitor always shows P00:
  - ➔ Fault in photocell, connector or controller. First try an alternative photocell to verify that controller is OK
- I/O monitor always shows P10:
  - ➔ Fault in photocell, connector or controller. First try an alternative photocell to verify that controller is OK

No print, shaft-encoder does not work:

- When using the I/O monitor function on controller “other functions” menu, the display “A00” changes rapidly to “A10”, “A11”, “A01” during conveyor movement:
  - ➔ Encoder working correctly – problem with message ?
- The I/O monitor shows one of the inputs not changing:
  - ➔ Faulty encoder ? Connect different encoder and spin the wheel by hand to see if inputs change

Print start slipping, image misalignment:

- Poor contact between shaft-encoder wheel and conveyor:
  - ➔ Rectify
- Encoder too far from print heads so that conveyor “stretch” causes problems:
  - ➔ Move encoder as close to print heads as possible
- Encoder mode not switched on:
  - ➔ Rectify
- Many conveyors vibrate when stationary causing false pulses to be sent by encoder. Does this occur during photocell delay?
  - ➔ Minimise photocell delay
- Photocell delay quite long and system line speed variable. The longer the photocell delay, the more chance for slippage:
  - ➔ Minimise photocell delay
- Photocell detection unreliable:
  - ➔ Inspect photocell. Determine a method of verification
- Photocell detection inverted. (Use I/O monitor):
  - ➔ Rectify



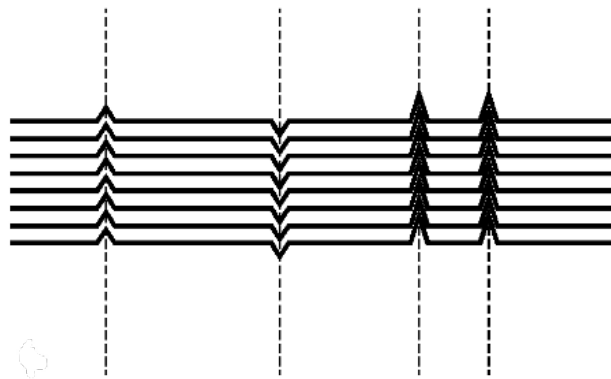
- Conveyor speed exceeding maximum print speed causing print “stretch”. Max speed is approx 40m/min at 100% print width, 20m/min at 50% and 80m/min at 200%:
  - ➔ Change width setting or encoder wheel

Z34 print-head, half of the message is inverted:

- Incorrect head configuration selected. This is common if CodeX files are used that were originally connected to other printer models:
  - ➔ Open all CodeX files, change the head configuration to 1x34mm etc., save and close



*Fig. 64: Horizontal print errors due to depriming*



*Fig. 65: Vertical print errors due to electronic problem or interference*

Leak from lowest print engine:

- Bottle is almost empty together with large temperature changes:
  - ➔ Use smaller bottles or fit shipping cap
- Reservoir level too high:
  - ➔ Alter level

Pump will not prime (the sound of the pump is too high):

- Air leak in tubes or fittings:
  - ➔ If leak is not obvious, return for repair
- Kinked tube:
  - ➔ Inspect for kinks in pump tube
- Direct prime module is blocked:
  - ➔ Return for repair

Pump runs continuously

- FPGA is damaged (perhaps due to incorrect use of internal photocell option):
  - ➔ Replace FPGA chip
- Pump wire is shorted somewhere:
  - ➔ Inspect and repair